VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

Virginia Department of Health
DIVISION OF HEALTH HAZARDS CONTROL
P.O. Box 2448, 109 Governor Street
Richmond, Virginia 23219; Phone: (804) 864-8182
www.vdh.virginia.gov/hhcontrol/index.htm

FREQUENTLY ASKED QUESTIONS ABOUT ARSENIC

What is arsenic?

Arsenic is a naturally occurring element often combined with other elements such as oxygen, chlorine and sulfur to form “inorganic” compounds, or carbon and hydrogen to form “organic” compounds. It is a slivery-gray, semi-metallic substance that tarnishes in air. Inorganic and organic arsenic compounds are white in color, and have no smell or special taste. Inorganic arsenic occurs naturally in certain types of soils and rock formations. Inorganic arsenic compounds are mainly used as a preservative in pressure-treated wood to make it resistant to rotting and decay. Organic arsenic compounds are used to make several types of insect killers, weed killers, and fungicides.

How might I be exposed to arsenic?

Low levels of arsenic are present in soil, water, food, and air. Therefore, people are exposed to arsenic through eating food, drinking water, or breathing air containing arsenic. If wells are drilled in areas where arsenic is present in the soil or rock, drinking water can become contaminated with arsenic. Soil contains average levels of about 5,000 parts of arsenic per billion parts of soil (ppb). Levels in food are about 20-140 ppb and levels in water are about 2 ppb. Fish and shellfish usually contain high levels of organic arsenic. Levels in air are usually about 0.02-0.10 micrograms per cubic meter. Of these, food is usually the largest source. The total intake from these sources is about 50 micrograms each day. Other sources of exposure are breathing sawdust or burning smoke from wood treated with arsenic, living near hazardous waste sites, and living in areas with high natural levels of arsenic in rock, or working in an occupation that involves arsenic production or use such as copper or lead smelting, wood treating, and pesticide application.

How does arsenic get into and leave the body?

Arsenic enters the body by breathing the air, drinking water, or eating food containing it. Most of the arsenic breathed in settles in the lungs and is distributed into the bloodstream. Once in the blood, the liver changes much of arsenic into less harmful organic forms. Absorption of arsenic through the skin is minimal. Both inorganic and organic forms leave the body in the urine. Most of the arsenic leaves the body within several days, although some remains for several months or even longer.

How can arsenic affect my health?

Organic arsenic compounds are less harmful than inorganic arsenic compounds. Inorganic arsenic has been recognized as a human poison since ancient times, and large oral doses above 60,000 ppb in food or water can produce death. Swallowing lower levels of inorganic arsenic, ranging from about 300 to 30,000 ppb in food and water, may cause irritation of the stomach and intestines, with symptoms such as pain, nausea, vomiting, and diarrhea. Other effects after swallowing arsenic may include decreased production of red and white blood cells, abnormal heart rhythm, blood vessel damage, and impaired nerve function causing a "pins and needles" sensation in your hands and feet.

(Over)

Long-term ingestion of inorganic arsenic can cause darkening of the skin and the appearance of small corns or warts on the palms, soles, and torso. A small number of the corns may ultimately develop into skin cancer. Drinking water contaminated with high levels of arsenic has been associated with increased risk of cancer of the skin, lungs, bladder and kidney.

Breathing high levels of inorganic arsenic may cause a sore throat, irritated lungs, and some of the skin effects. The exposure level that produces these effects is uncertain, but is probably above 100 micrograms per cubic meter. Long-term inhalation exposure in an occupation using arsenic increases the risk of lung cancer. Direct skin contact with inorganic arsenic compounds can cause irritation of the skin with some redness and swelling.

Does arsenic cause harmful effects on the fetus?

Although there is no good evidence that arsenic can harm pregnant women or their fetuses, studies in animals show that doses of arsenic that are large enough to cause illness in pregnant females may cause low birth weight, fetal malformations, or even fetal death.

Is there a medical test to show whether I have been exposed to arsenic?

There are tests to measure the level of arsenic in blood, urine, hair, or fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. However, these tests cannot predict whether one will develop lung cancer or other harmful effects.

What is the air quality standard for arsenic?

There is no ambient air standard for arsenic. The Occupational Safety and Health Administration has set a maximum permissible limit of 10 microgram arsenic per cubic meter of workplace air for 8-hour shifts and 40-hour workweek.

What is the drinking water standard for arsenic?

The U.S. Environmental Protection Agency (EPA) has set a maximum contaminant level (MCL) for arsenic in drinking water at 50 micrograms per liter or 50 ppb. However, EPA has revised the existing standard for arsenic in drinking water to 10 ppb. This revised standard will take effect beginning January 23, 2006.

Where can my physician or I get more information?

If you have any more questions or concerns regarding the health effects of arsenic, you may call Virginia Department of Health, Division of Health Hazards Control, (804) 864-8182, or visit Web site at http://www.vdh.virginia.gov/hhcontrol/index.htm

Agency for Toxic Substances and Disease Registry, 1-888-422-8737, or visit Web site at www.atsdr.cdc.gov/tfacts2.html

For information about how to reduce arsenic levels in drinking water, please call Office of Drinking Water, Virginia Department of Health, (804) 864-7493.

Prepared by: John S. Marr, M.D., M.P.H.
April 26, 2005